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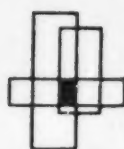
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ABSTRACT

Noting that the terms "language of mathematics," "language of science," and "language of business" represent very real language differences which frustrate even good readers, this curriculum report suggests several procedures teachers might use to assist students in reading in varied content areas. The procedures include teaching students to recognize how textbook authors shape concepts by the use of sentences, paragraphs, and graphic aids; serving as models for students by adjusting reading rates, by learning new vocabulary, by identifying how authors' shape concepts, and by struggling with problems; selecting reading materials in content fields on the basis of conceptual as well as technical difficulty; and strengthening student responsibilities in reading assignments. Descriptions of several successful programs for content reading instruction are included. (DF)

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CURRICULUM REPORT

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Making an Impact by . . . Reading in the Content Fields

Tomorrow we will discuss the idea of Manifest Destiny. Read pages 191-207. Keep in mind the unique combination of open land, growing population, and strong nationalism of the times. Also, know the map on page 199. Any questions? You are dismissed.

Does this homework assignment sound all too familiar? Does it do the job for the student? Are students prepared for important concepts to be learned? How many will understand the question, "Why is the idea of Manifest Destiny important to us today?"

Reading in the content fields requires special skills. One may read quite differently for understanding in history than for understanding in science. Beyond that, what student in any subject will admit a book is too difficult to read? Certainly not the students who can pick up ideas by listening and thus slide through.

Little value comes from teachers who admonish, "You will have to read the material very slowly," or "Try reading this assignment four or five times," or "Try reading the material out loud." The student may try all of these things and still have trouble. But good advice can be given. This Curriculum Report suggests some ways to resolve the dilemmas. Furthermore, a person does not need to become a reading specialist to apply the ideas found here:

- a new rationale for providing reading instruction through the content fields
- suggestions for selecting textbooks and other materials in the content fields
- practical ways to make students responsible to read to learn content
- an effective procedure for teaching reading skills for transfer to a variety of reading materials
- descriptions of several successful programs for content field reading instruction.



Shifting Gears Between "Languages"

When secondary students enter their content field classes, they leave behind the ordinary language used with family and friends. During any one school day, students "tour" from four to eight courses. Each content field has its own vocabulary, way of perceiving the world, and way of shaping and presenting information; in short, its own language.

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The terms "language of mathematics," "language of science," or "language of business" represent some very real language differences which frustrate many students--even the good readers. Content field teachers, however, can resolve many of these differences. Furthermore, they can do so without "watering down" their standards and without losing valuable class time.

Each content field contributes different terms to a student's overall vocabulary. To prove this point, we grouped words from textbooks into the eight categories found in Roget's Thesaurus. The results of this informal study are startling. Here are the results of the percentages of vocabulary for word categories by content fields:

Percentages of Textbook Vocabulary by Content Field

	Abstract Relations	Space	Physics	Matter	Sensation	Intellect	Volition	Affections
Biology	15	14	5	52	4	2	8	1
Business	35	5	3	3	0	11	40	4
History	8	8	0	8	0	4	54	18
Math	64	14	0	0	1	14	7	1
Physics	38	22	28	2	4	3	2	0

Each content field focuses on different areas and has, therefore, its own set of labels.

Specifically, teachers of mathematics need to know that most of the vocabulary found in their textbooks involves abstract relations. Teachers of science need to see the specific ways the vocabulary of biology differs from the vocabulary of physics. History teachers will find it interesting that their textbooks' vocabulary consists largely of volition and affections. Also, many words have several meanings within and among content fields. "Prove" may have any of six meanings in mathematics. "Root" and "colon" have different meanings in science and English. Remind teachers how subtle and yet frustrating these vocabulary differences are for students taking a variety of content field classes.

■ Textbook Authors Shape Concepts

Consciously or unconsciously, textbook authors use sentences, paragraphs, and even graphic aids to present and shape the concepts of their disciplines. Yet students often do not "see" these shapes or purposes and merely skim over the meanings. Most sentences do have a subject and a verb and most paragraphs have a topic sentence. Science teachers, however, need to show more; for example, the way some sentences state laws or direct actions, or hypothesize. Furthermore, while the shapes or purposes of textbook sentences may not always be discipline-specific, they are significantly different from our conversational language. They are appropriate for the purpose at hand.

■ Teachers as Mediators and Models

Teaching the languages of the content fields involves some appropriate modeling. Students need to see their teachers adjusting reading rates, learning new vocabulary, identifying how authors shape thoughts, and struggling with difficult problems. When students observe teachers working with difficult textbook language, students begin to apply the same techniques independently.

For example, social studies teachers who have studied the interactions of people with the environment need to teach students more than terminology. Students in social studies need to observe their teachers gathering data, selecting and using statistical measurements, and reasoning cause-effect relationships.

Watch how interested and involved content field teachers can become teaching the "language of their discipline" as contrasted to teaching what they consider "remedial reading skills."

■ Selecting Reading Materials in Content Fields

Several publishers accommodate reading problems in secondary schools by making their printed materials available at various levels of comprehension. Reading level, however, is only an estimate of the technical, not conceptual, difficulty of the material. It is based on average sentence length and average word length. Teachers must understand more than the estimated technical reading level when selecting materials, since the reading level of any material does not guarantee that students can/cannot and will/will not read the material.

It helps to have teachers clarify the use their materials will have in class. Do they want their textbooks to reinforce class presentations? Do they want easier reading for poor readers? Do they want magazines or workbooks to provide enrichment and practice activities?

While different teachers will use the same materials for different purposes they all should know the specific strengths and weaknesses of the material. After learning where a book begins and ends as content material, teachers should know:

- How content-specific vocabulary is introduced and reinforced
- How clearly directions are written
- How background explanations are organized
- How well the interest level is developed and maintained.

To learn more specific strengths and weaknesses of printed materials, teachers may want to use the Reading Analysis packet available from the Reading Writing in the Content Fields Program at the University of Northern Colorado in Greeley, or they may want to use the Evaluation of Instructional Materials book available from the San Mateo (Calif.) County Office of Education.

■ Strengthening Student Responsibilities

There's more to reading in the content fields than meets the eye. Teachers have many opportunities to encourage student responsibility for using reading to improve content field understanding.

***For example, the beginning of a course:

Effective teachers know that the first few days of any course are crucial. Students and teachers need to learn about one another and about the course materials. Specifically, students need to learn pertinent note-taking techniques (there are more than 30 methods), use of printed materials, course goals and procedures, and grading standards. Some teachers administer short, informal reading tests and attitude surveys. Interpretation of these data helps teachers to adjust their teaching styles.

***At the beginning of a class:

Students need a few minutes at the beginning of each class to "shift gears" to the language of the class. Teachers could help students adjust to the language of their classes in the following ways:

1. Establish the focus of the day's work.
2. Model how to pronounce difficult words and how to intonate when reading.
3. Review, perhaps with such activities as crossword puzzles or word games, the concepts or processes under study.

***When giving reading assignments:

Teachers can mediate difficult textbook language for students. Teacher mediation helps students raise pre-reading, during-reading, and post-reading questions. An active, questioning reader maintains concentration and remembers more readily than the reader who expects the material to do all of the work.

Also, teachers can show students how to read the same material for a variety of purposes: to gain background, to criticize the author, or to learn how to make something.

The complexity of making clear reading assignments dictates that rarely, if ever, should students be expected to read an entire chapter at any one time.

***In-class discussion:

Telling students what they should have learned when reading is not a good treatment of a reading assignment. Rather, teachers should discover what the students learned when reading and what difficulties they encountered. Teachers then can lead informal discussion about the ideas and facts the students gathered. A good in-depth discussion using the language of the content field can follow this step. Teachers will find, by using this approach, that their students will want to complete assignments, will complete them successfully, and will do so with increasing independence. Try it two or three times and observe the results.

***Test preparation:

Teachers can influence student reading patterns when preparing them for tests and examinations. Students would appreciate knowing what teachers mean when using common

essay question verbs: for example, "compare," "outline," or "discuss" often have different meanings within and among classes. Students want to know how to budget their time when studying for and taking tests. Many teachers use "test-practice days" to clarify their expectations and to eliminate unnecessary test anxiety.

***At the end of class:

As the end of class approaches, students begin to "shift gears" from the language of the class to out-of-class activities unless the teacher:

1. Entices students with an overview of the next class.
2. Models how to set short-term and long-term memory goals.
3. Reviews or provides practice for important reading and study skills.
4. Answers questions while students begin to work on their assignments.

Rarely, if ever, is the end of class an appropriate time to make reading assignments.

***Teaching a reading skill so it sticks and transfers:

Here is a procedure for teaching general as well as discipline-specific reading skills. Many teachers are amazed with the success of this procedure, especially for math or science skills.

1. Tell students the material, tools, and time involved in learning the skill.
2. Name the skill.
3. Demonstrate the importance of the skill using material which illustrates a need for the skill.
4. Present the skill by telling, modeling, or asking questions until students figure out what to do.
5. Ask students to explain what to do and why when applying the skill.
6. Reinforce immediately. If students cannot explain what to do they will need another method of presentation. See step four.
7. Provide materials for students to practice the skill. (Too often the first step used by teachers.)
8. Tell students immediately how well they have mastered the skill.
9. Provide other materials to transfer application of the skill.

Steps one through four are interchangeable.



Teacher Certification and Selection: New Hope

New approaches to the hiring and certification of teachers promise a brighter future for reading. Educators now recognize that an inability to help students cope with the language of the content field may render the most knowledgeable and personable teacher ineffective.

More than half of the 50 states now require teachers to take at least one reading education course to meet or to maintain certification standards. Certain states also require a second reading education course. In some instances, this course is a supervised practicum for using reading to teach content on a one-to-one basis or in a group setting.

More and more school districts are looking closely at the reading instruction background and skills of their teacher candidates. While the theory and practice of content-field reading instruction has been here for more than 20 years, most programs have to show much teacher and student impact.

9 CONTENT AREA READING TEAM
Boulder Valley Public Schools
6500 Arapahoe Road
Boulder, Colo. 80203

Contact: Bobbie J. Lewis, Coordinator

Organized in June 1975, as a Right-to-Read project with strong administrative backing, this team of more than 60 classroom teachers provides inservice workshops and printed materials for immediate classroom use.

The premise for the organization of this K-12 team is that classroom teachers listen to other classroom teachers more readily than they listen to professors.

Regular training and coordination sessions precede the team's grassroot activities. Functioning within reasonable expectations for availability and only upon request, the team provides workshops for teachers in the Boulder Valley Schools and in other districts throughout the Rocky Mountain region.

District reading specialists worked closely with team members to construct and revise a Practical Resource File and an Inservice Manual. The Practical Resource File, a color coded handbook, contains hundreds of specific, practical teaching ideas for using reading in specific subject fields and in the content areas.

The Inservice Manual deals with such things as training new members of the team, and planning and presenting inservice workshops.

Both the File and the Inservice Manual are available from the program coordinator.

9 PROJECT CONTENT-COGNITION: READING

Administration Building
Cleveland Public Schools
Cleveland, Ohio 44114

Contact: James Mills, Project Manager

The Martha Holden Jennings Foundation funded the initial work of this project where the goal is to teach students to think about what they read rather than just to teach them to read. District funds have maintained the project for the last two years in social studies and English.

The project is based on the fact that regardless of a course's title, similar cognitive skills are involved in reading its content.

During the 1975-76 school year, science teachers wrote, field-tested, and revised three notebooks of science reading units--earth science for seventh grade, physical science for eighth grade, and biology for ninth grade. Videotapes from large-scale class testing are available to show teachers how to apply the materials in their classrooms.

Results of the science project were encouraging. A 40 percent gain was reported in teacher proficiency for using reading-thinking skill techniques. An increase of more than 20 percent was reported in student reading comprehension of the subject material. Similar results were reported for the social studies and English programs.

Write the project manager for information about the videotapes and notebooks.

9 READING-WRITING IN THE CONTENT FIELDS PROGRAM

University of Northern Colorado
Michener Library, Room 13
Greeley, Colo. 80639

Contact: Robert A. Pavlik, Director

The College of Education and the College of Arts and Sciences sponsor eight half-day meetings per year for selected content field teachers at UNC and in 17 area school districts. Approximately 125 high school and college teachers from several disciplines attend short symposia and specific workshops for their respective disciplines. The symposia provide background information and teaching ideas for reading and writing assignments, and include reading and writing resource teachers working with content field teachers to construct diagnostic reading tests for each discipline, appraisals for major writing assignments, and handbooks of ideas for teaching reading and writing in the content fields.

The program has several ripple effects. Secondary school and university teachers communicate regularly about teaching ideas related to the languages of content fields. In addition, UNC departments and public school districts have an Advisory Council to direct a variety of staff development and student impact activities.

• BLOOMINGTON HIGH SCHOOL NORTH READING PROGRAM
301 Kinser Pike
Bloomington, Ind. 47401

Contact: Karen Kletzing, Reading Resource Teacher

Administrators and teachers at Bloomington support a two-dimensional reading program which has been very successful. The first dimension is available to all juniors and seniors. Some students elect a nine-week College Survival Reading Course. After students practice their new skills for note-taking, adjusting reading rate, taking tests, and using the library, they construct a Personal Study System. Each student meets with the reading teacher to demonstrate how he can apply his Personal Study System to actual college-level textbooks in a variety of content fields.

Juniors and seniors may enroll in a semester course for Personal Survival and Enjoyment Reading. The reading teacher provides initial instruction for reading application forms, warranties, etc. Then students apply PAWNED, a worksheet for guiding students in decision making for efficient reading, to each type of survival reading.

The second dimension, a peer tutoring program, allows students with less severe reading problems to work regularly with students having more severe reading problems.

Standardized reading tests and the Mikulecky Attitude Survey are used to evaluate both dimensions of this program. Significant improvements in both reading abilities and attitudes are reported.

• P. K. YONGE READING PROGRAM
1080 Southwest Eleventh Street
College of Education
University of Florida
Gainesville, Fla. 32611

Contact: Helen Guttinger or Anita Buck

Florida's P.K. Yonge model for teacher and student impact is gaining momentum throughout Florida, Georgia, North Carolina, Indiana, Illinois, and Bogota, Columbia.

The model offers three levels of intensive workshops spanning several months to initiate and reinforce staff and student development. The Level I workshops, held at the P.K. Yonge Laboratory School at the University of Florida in Gainesville, feature four consecutive days of activities which include orientation to the developmental, individualized reading model; diagnosis of the participants' personal reading abilities and attitudes; and consultations and workshops to pursue professional goals. The P.K. Yonge staff integrate reading theory and instruction with counseling theory and instruction throughout the Level I activities.

Program staff discovered that the model will not get off the ground unless the Level I activities involve representatives of a school's administration, content field teachers and coordinators, and reading teachers.

The Level II workshops are held in the participating school districts. Program staff along with the Level I representatives meet with the entire faculty to plan the implementation of the student impact model.

- Students in heterogeneously grouped content field classes work with the reading teacher three days per week for nine consecutive weeks. Program researchers found no significant differences in student reading growth for three, four, or five days of involvement per week.
- Students learn and apply both general and discipline-specific reading skills.
- Content field teachers must attend and/or participate in the lessons which the reading teacher provides.

P.K. Yonge staff along with administrators and teachers from other districts explain their involvement in the program as part of the Level II activities. Almost without exception, the local school's reading teacher is swamped with requests from the content field teachers to participate in the program.

The Level III workshops are held at the P.K. Yonge facilities. Participants from the local schools share experiences and research findings, and they brainstorm on solutions for problems related to the teacher and student aspects of their local programs. Level III workshops also attempt to develop leadership skills for maintaining the local programs.

An active evaluation component provides voluminous data for the positive impact upon content field teachers and students.

The P.K. Yonge Reading Program is in its seventh year. Recently, the program leaders received Title IV C funding for additional implementation and dissemination activities. Write the program leaders for workshop materials and reports.

• 9 LA FOLLETTE HIGH SCHOOL READING PROGRAM
702 Pflaum Road
Madison, Wisc. 53716

Contact: Bernice Bragstad, Reading Consultant

Seven years ago, LaFollette High School initiated a total school reading program embracing all students and all content fields. Today, the program has six dimensions as follows:

I. Horizontal Dimension (for all students). With the strong endorsement of the teachers' association, faculty members in science, social studies, English, physical education, and vocational education took 30-hour courses in reading instruction for their content area.

Each staff member completed a comprehensive needs assessment which the reading consultant used to design each course--worth three semester hours of credit. After the teachers completed their respective courses, they met with the reading consultant for one-to-one assistance in ways to help their students with the reading-learning process.

Reinforcement occurs now among departments for skills relating to reading, writing, listening, and viewing films. This horizontal dimension led to the other program dimensions described below.

II. Vertical dimension (for all students). Provides for skill development within each department. LaFollette High English teachers wrote a sequential curriculum for skills development in all communication processes. Other departments now use this curriculum as a prototype for their vertical skills instruction.

III. Efficient Reading Course (approximately 300 seniors plus several sophomores and juniors). An elective college-preparatory reading course called Efficient Reading. Reading specialists provide students with instruction for improving reading rate, vocabulary, comprehension, and study strategies.

IV. Reading Improvement Course (about 200 sophomores). Sophomores may elect Reading Improvement, a corrective reading course taught by reading specialists and taken for English credit. Some students need this specialized help for more than one year.

V. Learning Center for Tutoring. Students tutor other students in all subjects. The Learning Center coordinator schedules students to work every day in the high school and area feeder schools.

VI. Data Gathering. Content field teachers are usually too busy to gather pertinent data about students' reading habits, attitudes, and preferences for learning. The reading consultant gathers data to assist in directing the efforts of the program's other dimensions.

Significant gains in student reading abilities and attitudes are reported with both standardized and competency-based tests and with surveys.

9 VOCATIONAL READING POWER PROJECT
2100 Pontiac Lake Road
Oakland Public Schools
Pontiac, Mich. 48054

Contact: Roy J. Butz, Director

ESEA Title III funds were used six years ago to implement this staff development program. Teachers of vocational arts and reading worked together to write bi-level glossaries for 32 occupations. Each glossary features formal and informal definitions of job-specific vocabulary.

Originally, the goal of this program was to minimize the reading problems students have with the printed materials in vocational courses. However, word-of-mouth selling by the vocational arts teachers led program leaders to include most other content fields in the program.

Materials for staff development now include articles about reading in the content fields and 18 auto-instructional modules on such topics as readability, vocabulary development, and teaching content-specific reading skills. Comprehensive research, development, evaluation, and dissemination components comprise the program. For further information on these components, write:

Thel Kocher or Eileen Ostergaard
Exchange 16
Pike Hall
University of Minnesota
Minneapolis, Minn. 35455

Content field and reading teachers provide initial and follow-up inservice for school districts throughout the nation. The training and adoption costs are minimal.

The transfer of reading skills from language classes to content field classes is not automatic. Classroom teachers ultimately determine whether or not and how well their students use reading to learn content.

9 GEORGE W. WINGATE HIGH SCHOOL
Kingston Ave. and Winthrop St.
Brooklyn, N.Y. 11203

Contact: Robert Schain, Principal

Wingate High School is an all-minority, inner-city school with a student population of more than 3,000. The school "has had all the reading problems a high school can experience," according to Principal Schain.

One obstacle Wingate appears to have overcome is the severe deficiency in reading skills of new students. Two-thirds of the students are functionally illiterate when they enter the school, Schain notes. Working together, Wingate teachers have found that by teaching reading skills in all subjects they can improve the reading skills of these students.

Developing Reading Skills Through Subject Areas is a 72-page handbook for teachers developed by the Wingate teaching staff. Included are practices found to be effective in helping students develop such reading skills as building vocabulary, finding details, finding the main idea, making inferences, and following directions. The practices are simple and sensible; they do not require that content area teachers become reading specialists. Copies of the handbook are available from Wingate High School at a cost of \$5.00.

KUDOS.....ROBERT A. PAVLIK developed the material for this Curriculum Report. An English and reading teacher in Waukesha and Lake Geneva, Wis., for eight years, he is now director of the Reading-Writing in the Content Fields Program at the University of Northern Colorado in Greeley.

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